Fitting Protector

The present invention relates to a fitting protector for use in a ceiling void. The fitting protector finds particular use in preventing insulating or inflammable materials from coming into contact with recessed light fittings.

A variety of fittings, such as recessed light fittings, can extend into ceiling or roof voids, but must not come into contact with material such as insulation that is placed in those voids. Recessed light fittings can in normal operation become very hot and contact between such hot fittings and insulating material (or other inflammable material) is dangerous as it can lead to fire or damage.

It is therefore desirable to provide some form of guard or shield that prevents contact between the fittings and the insulation material. Some attempts have been made to address this problem, but these prior efforts have failed to produce a simple cheap effective solution. Worse still, the previous efforts have required complicated or time-consuming fitting which made them unsuitable. In contrast the present invention aims to provide a simple mechanism by which fittings can be protected from contact with insulation material, which mechanism is simple and quick to install, is stable once installed, and which permits a proper depth of insulation to be fitted close to lights and other such fittings. It further aims to provide a fitting protector that may be adjusted to fit around a variety of differently sized-fittings.

Therefore according to the present invention there is provided a fitting protector for use with a fitting that extends through ceiling material into a void therebehind, comprising a shell adapted for location within the void around that part of the fitting which extends into the void, and locating means adapted to co-operate with a mechanism by which the fitting is held in place, so as to hold the shell in place around the fitting such that the shell prevents insulating material in the void coming into contact with the fitting.

In one embodiment it is preferred that the locating means include a tab that extends from the shell and in use lies against the ceiling material and is engaged by said mechanism. More than one tab may be used, and the or each tab may extend inwardly from the lower edge of the shell toward the fitting. If more than one tab is used, the tab may be positioned at suitably

spaced locations such that once each tab is fixed down the stability of the shell is enhanced. The tab may extend across the lower end of the shell with each end of the tab being fixed to a different region of the tab.

The mechanism by which the fitting is held in place may comprise fixtures such as screws that are connected to the ceiling material, and the tab may be adapted for connection to the ceiling material by the same screw or screws. However, many recessed fittings, especially recessed light fittings are attached to the ceiling material by spring-mounted arms that bear on the rear face of the ceiling material. These pull the fitting upwards until suitable abutments on the fitting come into contact with the front face of the ceiling. No other fixing is needed because the tension in the spring holds the fitting in place. When used in conjunction with such fittings the tab or tabs may be adapted to locate between the ceiling material and the spring-mounted arms, such that the protector is held in place.

In an alternative construction, the shell may be provided with one or more slots, into which one or more of the spring-mounted arms of the fitting may locate. These slots would be formed near the lower edge of the shell and would extend generally horizontally. The spring-mounted arms of the fitting would locate into these and bear downwardly on their lower edges thus holding the shell against the ceiling and securing the fitting. Only one slot is needed but it is preferred that two are provided and that these are provided on opposite regions of the shell, although not necessarily on different parts (if the shell is formed from relatively separable parts).

The shell may be a complete construction that is placed over the fitting. Alternatively the shell may comprise two relatively separable parts to permit location of the shell around a fitting. Whilst the two parts of the shell may take a multitude of suitable forms, it is preferred that each of the two parts is generally channel-shaped. The channel-shaped parts may be generally symmetrical halves of a shell, or may be different but complementary in shape, with for example one part defining most of the shell and the other part defining the remaining regions.

The two parts of a shell need to be connected together, and this can be done in several ways. Each channel-shaped part can have a pair of flanges and the flanges of one part can inter-engage with the flanges of the other part.

This inter-engagement can be such that the two parts are relatively adjustable so that the volume defined by the shell is similarly adjustable. Alternatively, the inter-engagement can produce a fixed size shell.

The outer edges of the flanges of one channel-shaped part may be adapted such that they can be received in suitably adapted co-operating means provided on the flanges of the other channel-shaped part. Alternatively the flanges of one channel-shaped part may overlie the flanges of the other channel-shaped part and may be connected thereto by clips. Such clips may be separate from the shell and be connected thereto only when joining the overlying flanges of the two parts. In a further alternative embodiment, the flanges of one channel-shaped part may be adapted to engage the flanges of the other channel-shaped part by sliding inter-engagement in a lengthwise direction. Additionally the flanges may interengage by a sliding resilience or resistance fit. For example the flanges of one part may distort or flex slightly to locate between the flanges of the other part, with the relative spring force between the two increasing the friction therebetween to prevent unintentional separation.

The two parts of the shell may be hingedly connected together so that relative separation of the two parts involves pivoting about the hinge. The hinge may be provided between the outer edges of two flanges of separate parts, with the outer edges of the other flanges being brought together or separated by relative hinging of the two parts of the shell. Means may be provided to connect the edges of the unhinged flanges together as required.

The shell may take any suitable overall shape, but it has been found that for ease of construction the shell may form a tube of generally square or circular cross section, which has an open lower end that lies against the ceiling material and an open upper end. To form such tubular shells, each channel-shaped part has a generally rectangular or semi-circular cross-section as appropriate.

As mentioned above, the upper end of the shell may be open, and this permits heat generated by the fitting to be dissipated, as well as permitting the entry of wiring and other services. In most cases the height of the shell will be such that the top of any insulation layer is below the top of the shell. However, in some circumstances such as when deeper insulation is to be

used, it may be desirable to close the upper end of the shell. This upper end may be closed by providing on one or both parts a suitable screen or screens that extend across the channel-shaped parts between the flanges thereof. These screens or indeed the shell itself can be formed from solid material or from mesh, which allows heat transmission from within the shell.

The main intended purpose of the protectors according to the present invention is to prevent insulation coming too close to recessed light fittings, which can become hot during use. Therefore it is preferred that the protector is mounted around such a light fitting and that it is particularly adapted for this purpose.

When the fitting around which the present invention is arranged is an electrical one, it is desirable to provide addition enhancements to facilitate correct connection of the fitting and any associated component. If the fitting is a light, there might easily be a transformer that converts the voltage of the electrical supply. To this end the shell may be adapted to support a transformer or other component connected to the fitting. This would both conveniently support the transformer or other component, and allow for easier fixing.

Support of the transformer might be achieved by providing a shell wherein the upper edge thereof is cut to form one or more tongue that may be bent out of the plane of the shell to allow engagement thereto of a transformer or other component. The transformer might be engaged by passing the one or each tongue through apertures on the transformer (such as might normally be used to fix the transformer down), or the transformer might be placed between the angled tongue(s) and the remaining portion of the shell.

Instead of forming tongues by cuts in the shell, a similar result can be achieved by the use of prongs attached to the shell which in normal use lie substantially parallel to and against the shell, but which may be selectively bent away therefrom to permit the support of a transformer or other component. Alternatively pegs might be provided to engage with the shell such that the transformer or other component may be located on the pegs.

A further alternative mechanism is to provide an opening (or openings) on the shell and tie members that pass through such an opening and connect to or around the component to hold it in place. The tie member could take the

form of a deformable or malleable strip that may be passed around the component and through the opening thereby to hold the component. To achieve this an opening at or adjacent the upper end of the shell and a metal tie in the form of a strip are preferred.

The shell may also be provided with other openings to permit the entry/exit of wires and other parts associated with the fitting.

In order that it may be better understood, but by way of example only, the present invention will now be described with reference to various different embodiments shown in the accompanying drawings, in which:

Figure 1 is a perspective view of a first embodiment of the invention;

Figure 2 is a side elevation of the embodiment of Figure 1 connected to the upper side of a ceiling;

Figure 3 is a plan view of the embodiment of Figures 1 and 2 showing the light fitting engaging the tabs;

Figure 4 is a view similar to that shown in Figure 1 but of a slightly different second embodiment;

Figure 5 is a view similar to Figure 2, but showing the second embodiment of protector in use;

Figure 6 is a plan view of the second embodiment of Figures 4 and 5 showing the light fitting engaging the tabs;

Figure 7 is a partial view of a third embodiment of protector which is provided with means to support a transformer;

Figure 8 is similar view to that shown in Figure 7 of a fourth embodiment of protector provided with an alternative means of supporting a transformer;

Figure 9 is again a similar view to Figures 7 and 8 of a fifth embodiment of protector with a further alternative means of supporting a transformer;

Figure 10 is a cross section of the third embodiment shown in Figure 7 mounted in a roof space around a light fitting;

Figure 11 is a perspective view of a fourth embodiment of fitting protector but not showing the fitting in the ceiling material;

Figure 12 is a part cross-sectional view from the front of this fourth embodiment mounted on a ceiling and around a light fitting;

Figure 13 is a side view of the assembly of Figure 12;

Figure 14 is the opposed side view to that of Figure 13;

Figure 15 is a perspective view of am upper portion of the fourth embodiment of fitting protector; and

Figure 16 is a similar view to that of Figure 15 but of a slightly different fifth embodiment with a different mechanism for attaching the transformer.

Referring initially to Figure 1 there is shown a first embodiment of fitting protector generally indicated 10. The protector 10 comprises a first part 11 and a second part 12, both of which are generally square channel-shaped. The channel-shaped first part 11 comprises a web 14 and a pair of opposed flanges 15, 16 that extend perpendicular therefrom, and the second part 12 similarly comprises a web 17 and opposed flanges 18, 19. Slots 20 are formed on the edges of the flanges 18 and 19, and these are adapted to receive the outer edges 21 of the flanges 15, 16 of the first part 11 so as to connect the two parts.

The distance between the flanges 15, 16 of the first part 11 is slightly greater than the distance between the flanges 18, 19 of the second part 12. This not only aids the connection of the outer edges 21 into the slots 20, but allows the second part 12 to be located within the first part 11 for storage. The second part 12, if rotated by 180°, will locate between the flanges 15, 16 of the first part 11, thus reducing the space needed for transport and storage of the unused device.

The second part 12 has, connected to its lower edge 23, a pair of opposed tabs 25, 26, which extend inwardly from the flanges 18, 19 and are approximately perpendicular thereto. The protector is shown in its normal orientation, with the lower end being placed against the ceiling material (not shown in Figure 1) and the upper end being open to permit the escape of heat from the light fitting that is being protected, and amongst other things the maintenance of the fitting.

In use, as is best shown in Figure 2, the two parts 11, 12 of the protector 10 are located around a fitting 30 and by locating the outer edges 21 in the slots 20, the two parts are fitted together to define an insulation free area around the light fitting 20. The protector is located on the upper side of a sheet of ceiling material 31, which is connected to ceiling supports 32, and

through which the fitting 30 extends. Insulation material 33 is packed around the protector to provide efficient insulation, without causing danger by coming into contact with the hot light fitting 30.

The light fitting is held in place in the ceiling material 31 by spring arms 34 that bear down on the upper side of the ceiling material 31 and pull the outer face 35 of the fitting 30 into abutment with the lower side of the ceiling material 31. As can best be seen in Figure 3 (which is somewhat simplified as compared to Figure 2) the spring arms 34 bear on the tabs 25, 26 and clamp them to the ceiling material 31 thereby holding the protector 10 in place.

The light fitting 30 is connected to a power supply by a cable 36, which passes out of the protector 10 through the open top thereof. The two-part construction allows the protector 10 to be fitted around the light fitting after it has been wired in and before the insulation material 33 has been laid.

A second embodiment of protector, generally indicated 40 is shown in Figures 4 to 6. This embodiment is very similar to that shown in Figures 1 to 3, save in that the mechanism by which the two parts are joined is different. Where possible like reference numerals have been used to refer to like parts.

In the second embodiment (Figures 4 to 6) the first part 41 is slightly wider that the second part 42 and the outer edges 21 of the first part 41 are adapted to overlie the outer edges 43 of the second part 42. The second part 42 is not provided with slots 20 as in the first embodiment, but in all other respects is the same. Elongate metal clips 44 are passed over the regions of the first and second parts which overlie each other, so as to fix them together. Such clips can be normally attached to one or other of the parts, or may be separate and connected thereto as required. In all other respects, as can be seen from Figure 5 and 6, the second embodiment operates in exactly the same way as the first embodiment.

As an alternative to having first and second parts of different widths, and connecting together by clips or other fasteners, it would be possible to have two parts that could be releasably engaged with a resilience fit. The flanges of the first part could be adapted to allow the location therebetween of the flanges of the second part (or indeed vice versa) with the natural resistance between the flanges being sufficient to resist relative movement in normal use.

The degree by which the first part 41 overlies the second part 42 can be varied, and therefore the volume defined by the shell of the protector 40 can also be controlled. This allows the protector to be fitted to a variety of different fittings, whilst allowing the appropriate separation between light fitting and insulation to be maintained.

Figures 7, 8 and 9 show the upper regions of respectively third, fourth and fifth embodiments of protectors according to the present invention. Each of these embodiments are similar to the second embodiment shown in Figure 4. The embodiments differ in that each are provided with differing means of supporting a transformer that is connected to the light fitting. In Figure 7 tongues 50, 51 are formed in the upper edge of the shell by cutting two parallel vertical incisions. These tongues can be bent outwardly with respect to the parts of the shell such that a transformer may be located thereon (see Figure 9).

Figure 8 shows an alternative embodiment wherein elongate pegs 52, 53 are connected to the shell by insertion into suitable apertures therein. Again a transformer, or indeed another component, may either be rested thereon or engaged therewith as shown in Figure 9.

In Figure 9 support means 54, 55 are connected to the shell. These each comprise a plate 56 that is fixed for example by welding to the shell, and a prong 57 extending therefrom. The prongs 57 can be bent out of the plane of the shell, such that a transformer 58 may be located thereon. One convenient method of locating the transformer 58 is to provide prongs 57 that may be bent to a position whereat they correspond to the placing of fixing holes 59 on the transformer 58. The transformer 58 can be placed on the prongs 57 simply by engaging the prongs 57 in the fixing holes 59 and allowing the transformer to slide under gravity to the bottom of the prongs 57 in abutment with the shell.

Figure 10 shows a cross section of the third embodiment of protector in use. The protector 60 is held in place around the light fitting 30 and against the rear of the ceiling material 31 by the spring arms 34 of the light fitting 30. Insulation material 33 is packed around the protector 60 between the supports 32. The transformer 58 is located on the outwardly bent tongues 50, 51 (only one of which is visible) and is connected to the light fitting 30 by wires 61.

The wires 61 might pass out through an open upper end of the protector, or as in this case pass through a special aperture in the shell. The transformer 58 is connected to the main supply through further wires 62 and a junction box 63.

Figure 11 shows a fourth embodiment of fitting protector according to the present invention. In this fourth embodiment, the fitting protector (generally indicated 70) comprises a larger channel-shaped first part 71 and a smaller second part 72 which engages with the first part by a resilient fit between the opposed flanges 73 and 74 of the first part, and the flanges 75 and 76 of the second part 72. Horizontal slots 78 and 79 are formed in the lower regions of the flanges 73 and 75 of the first part 71. As further shown in the subsequent Figures, these horizontal slots provide the means for attachment of the fitting protector to the ceiling material by the light fitting. The spring arms of the fitting extend through these horizontal slots and bear on the lower edges thereof.

The portion of the flanges 73 and 75 below the slots 78 and 79 may be deformed laterally out of the plane of the remainder the respective flange. This allows the distance between each to be adjusted to accommodate different sizes of fitting. For example if a fitting with relatively short spring arms is being used, the portions may be bent inwardly to an appropriate degree. Conversely if a greater separation is desired to accommodate a larger fitting, the portions may be bent outwards.

A deformable tongue 80 is formed in the upper edge of the first part 71 (in a manner as previously described) such that by deformation thereof a transformer or other component can be supported. A large aperture 81 is formed in the flange 71 (or in any other part of the shell) and this provides a route by which electrical connections to the fitting may be channelled other than through the open top of the protector. The advantage of providing a large aperture 81, as compared to a small one, is that it reduces the risk of damage to the wires and so removes the necessity for protective grommets. Further apertures (not shown) may be provided in the parts of the shell, either to facilitate entry/exit of other components, or to help in the dissipation of heat generated by the fitting. The parts of the shell may be formed from solid sheets or sheets of mesh material.

Figures 12, 13 and 14 each show the same embodiment as described with reference to Figure 11 but in an assembled condition and attached to the ceiling material 31 by a light fitting generally indicated 30. The light fitting 30 has spring arms 34 that are passed through the horizontal slots 78 and 79 and bear downwards on the lower edge thereof to hold the fitting protector 70 firmly against the upper surface of the ceiling material 31.

The light fitting 30 is wired in a standard fashion to a termination box 85, which extends out through the opening 81. This in turn is connected by wires 86 to a supply transformer 87. The transformer 87 is located on the outside of the fitting protector in the region of the upper edge thereof and is supported by the tongue 80 which has been bent into a suitable configuration to support it.

Figure 15 shows the upper part of the fourth embodiment of fitting protector 70 such that the connection of the transformer 87 to the tongue 80 is better shown. Also more clearly shown is the interengagement of the first part 71 and the second part 72. As can be seen the outer edges of the flanges 73 and 74 locate between the flanges 75 and 76 of the second part 72. The engagement of these flanges between the others is a resilience fit wherein the friction of that coupling is sufficient to hold the parts together except when they are pulled apart.

Figure 16 shows a fifth embodiment of fitting protector that is essentially identical to the fourth embodiment discussed above, however the mechanism by which the transformer 87 is connected to the first part is slightly different. In this embodiment, an opening 90 is formed in the first part adjacent the upper edge thereof. A tie strip 91 passes through the aperture 90 and around the transformer 87. The tie strip is formed from suitably deformable metal such that the strip may be bent to accommodate a variety of differently sized and shaped transformers but once bent therearound will not, unless deliberately opened, release the transformer under its own weight.

The protector may be made from a variety of suitable materials, however sheet metal such as steel has been found to be particularly well suited, both due to its strength and rigidity as well as its ease of handling during manufacture. Metal mesh is also useful. Fire retardant materials or coatings may be also be used.